

REMARKS

The Office Action dated August 31, 2009, has been received and carefully reviewed. The preceding amendments and following remarks form a full and complete response thereto. Claims 4-14 are amended as to form only. Claim 3 is amended as to form and to recite "while the means for aligning is aligning the single bank note." Support for this amendment may be found, inter alia, in para. [0007]. No new matter is added. Thus, claims 1-20 are pending in this application and are submitted for reconsideration.

Applicants submit that none of the amendments are substantive such that a new search or further consideration is required. The limitation added by the present amendment to apparatus claim 3, "the device for detecting the alignment detects the alignment of the single bank note ... while the means for aligning is aligning the single bank note," recites subject matter which has been previously searched and examined as recited in claim 1. In particular, previously presented claim 1 recites the analogous method step of "detecting the alignment of the single bank note during the aligning." With regard to claim 3, the device and means recited in the amended limitation have been previously presented and examined; the present amendment merely adds the previously examined aspect from claim 1 of detecting during/while aligning. Thus, no amendment raises new issues requiring further search or further consideration, and the amendments should be entered.

Claim Rejections – 35 U.S.C. § 102

Claims 1-6, 12, 13, 18 and 19 were rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by Patent 5,697,609 to Williams ("Williams"). Applicants respectfully traverse the rejection and submit that amended independent claims 1 and 3 recite subject matter not disclosed by Williams.

Claim 1, upon which claims 2 and 18 depend, defines a method for aligning bank notes in a transport system. The method includes the following steps: detecting an alignment of a bank note being transported separately in the transport system; determining from the detected alignment a deviation of the single bank note from a desired alignment wherein two edges of the bank note extend parallel to the transport direction of the transport system; aligning the single bank note in the desired alignment by displacing the single bank note in a direction deviating

from the transport direction of the transport system based on the deviation; detecting the alignment of the single bank note during the aligning, i.e., while the bank note to be aligned is being transported in the transport direction; and terminating the aligning, as soon as the single bank note has the desired alignment.

Claim 3, upon which claims 4-6, 12, 13 and 19 depend, defines an apparatus for aligning bank notes in a transport system. The apparatus has a device for detecting an alignment of a bank note being transported separately in the transport system, a device for determining from the detected alignment a deviation of the single bank note from a desired alignment wherein two edges of the bank note extend parallel to the transport direction of the transport system, and means for aligning the single bank note in the desired alignment by displacing the bank note in a direction deviating from the transport direction of the transport system, while the bank note to be aligned is being transported in the transport direction. The means is controlled by the device for determining a deviation. The device for detecting the alignment detects the alignment of the single bank note in the area of the means for aligning while the means for aligning is aligning the single bank note. The device for determining a deviation stops the means for aligning as soon as the single bank note has the desired alignment.

As a result of the claimed configurations, a method and system for aligning a sheet or bank note in a transport system is provided that has advantages including detecting an alignment of a bank note being transported in the transport system, determining a deviation of the bank note from a desired alignment based on the detected alignment. Further, the current alignment is checked during the aligning of the sheet or bank note and aligning is terminated as soon as the desired alignment is reached. Additionally, the alignment occurs while the bank note to be aligned is being transported in the transport direction and is effected by displacing the bank note in a direction deviating from the transport direction.

Williams describes a two-stage registration of pre-registration and actual (or "fine") registration. Citing reference numbers of components for both stages, "pre-registration" device 100 and the "fine registration" system, the Examiner contended that Williams anticipates claims 1-6, 12, 13, 18 and 19. However, the fine registration system and pre-registration device 100,

considered singly and in combination, fail to disclose or suggest each claim limitation.

Applicants discuss each consideration in turn.

For pre-registration, Williams teaches that (1) point sensor 122 detects the arrival [of the leading edge] of a sheet of paper; (2) steering rolls 106, pre-positioned to an angle alpha, move the paper at velocity V such that the lateral component V_x moves [a lateral edge of] the paper towards sensor 120; and (3) the yoke actuator 102 straightens the rolls to alpha=0 when sensor 120 detects [the lateral edge of the] paper. See col. 7 ll. 54-62 (the bracketed material follows directly from the locations of the sensors relative to the paper transport direction illustrated in Fig. 3). Because the pre-registration disclosed by Williams relies only upon a single leading edge sensor (122) and a single lateral edge sensor (120), it is impossible to detect an alignment, much less correct a misalignment. At best, the pre-registration sensor arrangement of Williams detects a presence of a paper and, if present, a gross position of the paper—that is, whether the paper covers none, one or both sensors. In fact, existence of the fine registration system following pre-registration device 100 directly implies that, after pre-registration, paper is not in a desired alignment. As a result, pre-registration device 100 fails to disclose or suggest any of the limitations of independent claims 1 and 3, each of which relates to detecting an alignment and effecting a desired alignment.

Applicants submit that the fine registration system disclosed by Williams also fails to disclose or suggest each limitation of independent claims 1 and 3. For example, Williams fails to disclose or suggest a step of aligning the single bank note in the desired alignment by displacing the single bank note in a direction deviating from the transport direction of the transport system based on the deviation, as recited in claim 1. Similarly, Williams fails to disclose means for aligning a bank note in the desired alignment by displacing the bank note in a direction deviating from the transport direction of the transport system, while the bank note to be aligned is being transported in the transport direction, as recited in claim 3.

In contrast to the claimed method and system, Williams discloses that fine registration, apparently equated with “proper position and orientation (zero skew)” at a datum 142, is achieved by imposing (impliedly) differential velocities V_1 and V_2 to the paper using nips 114 and 116. Col. 8 ll. 1-5. As is clearly illustrated in Williams figs. 3 and 4, nips 114 and 116

operate in the transport direction of the paper; thus, nips 114 and 116 cannot effect a displacement in any direction except the transport direction. Thus, Williams fails to disclose or suggest a step or means for effecting a desired alignment by displacing a bank note in a direction deviating from the transport direction of the paper as claimed.

Applicants submit that the fine registration system disclosed by Williams also fails to disclose or suggest steps for detecting the alignment of the single bank note during the aligning, i.e., while the bank note to be aligned is being transported in the transport direction, and terminating the aligning, as soon as the single bank note has the desired alignment, as recited in claim 1; or a device for detecting alignment detects alignment while a means for aligning is aligning the single bank note, and a device for determining a deviation stops the means for aligning, as soon as the single bank note has the desired alignment, as recited in claim 3.

In fact, within the four corners of the document, Williams is silent as to how fine registration is achieved. Williams merely discloses that once a sheet has entered the nip as detected by sensor 124, paper lateral position and orientation are determined from measurements provided by edge sensors 132 and 134; the measurements and arrival time are used to generate velocity profiles. Col. 8 ll. 10-16. Williams provides no disclosure as to effecting registration with velocity profiles, nor with regard to terminating a registration process. Williams admits this deficiency by stating that the “details of the fine registration system are described” in a related and incorporated patent document. Col. 8 ll. 35-41.

The related patent document is application 08/672,489 which issued as Patent 5,678,159 (“Williams ’159”) (Applicants have not obtained an “as-filed” copy of application 08/672,489 and therefore infer its contents based on an assumption that the disclosure of the as-filed application is substantially identical to that of the issued patent). Williams and Williams ’159 have a substantial amount of common disclosure; however, Williams ’159 omits detailed description of pre-registration device 100 and adds description of the fine registration process.

In sum, Williams ’159 teaches that a position and orientation of a sheet are determined once and, thereafter, no further determinations of position and orientation are determined and used to effect registration of the sheet. That is, Williams ’159 teaches that the state of the sheet at time=0 (the time at which the sheet is acquired by the nips) is measured. Col. 8 ll. 55-64.

Once the measurement has taken place, the nip velocity profiles are determined for moving the sheet from the initial state to the registered state. Col. 8 ll. 65-67. See also col. 9 ll. 15-17 (describing that coefficients for velocity equations are functions of “measured state at time 0” and desired state at time T_{reg}); col. 9 ll. 18-35 (“any motion for the sheet that passes through the measured state at time 0 and the [desired] registered state at T_{reg} and satisfies equation (6) may be chosen” (emphasis added)). Thus, Williams and Williams ’159 fail to teach or suggest detecting an alignment while aligning.

With regard to the disclosure of Williams ’159 that sensors 126, 132 and 134 are used to “further check” registration accuracy, col. 8 ll. 10-13, Applicants submit that this disclosure merely teaches that data from this further check are used to “update the registration scheme as rollers wear or become dirty.” Col. 8 ll. 13-16; col. 10 ll. 21-24. There is no disclosure or suggestion of recomputing velocity profiles for a particular sheet based on this further check, much less a disclosure or suggestion of terminating the aligning, as soon as the single bank note has the desired alignment as claimed in claim 1 or a device for determining a deviation stops the means for aligning, as soon as the single bank note has the desired alignment, as recited in claim 3.

Applicants submit that, even considered in combination as done by the Examiner, pre-registration device 100 and the fine registration system disclosed by Williams fail to disclose or suggest each element of independent claims 1 and 3. As set forth above, the pre-registration device 100 neither detects an alignment nor effects a desired alignment. Moreover, Williams discloses that rolls 106, used in pre-registration device 100, are controlled independently from the nips (114) used in the fine registration system and the controlling is based on distinct and independent sets of sensors. Compare col. 7 ll. 54-67 with col. 8 ll. 1-8.

Thus, Williams, even when and particularly when considered with Williams ’159, fails to disclose or suggest each limitation of independent claims 1 and 3. Therefore, the rejection of independent claims 1 and 3, and dependent claims 2, 4-6, 12, 13, 18 and 19, as anticipated by Williams is improper and Applicants request that it be withdrawn.

Claim Rejections – 35 U.S.C. § 103(a)

Claim 20 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Williams. Applicants respectfully traverse the rejection and submit that claim 20 recites subject matter that is neither disclosed nor suggested by Williams. Claim 20 depends from claim 16 which depends from claim 3. As set forth above, Williams fails to disclose or suggest each limitation of independent claim 3. Applicants submit that claim 20 is patentable at least due to its dependency to claim 3 and that the rejection is therefore improper. Moreover, the arrangement of rollers 106 and the controlling mechanical linkages do not permit the rollers to be oriented substantially orthogonal to the transport direction. See, e.g., fig. 2 (illustrating coupling of two rollers to a single common drive axis). Thus, Williams fails to disclose or suggest an alignment of rollers substantially orthogonal to the transport direction as claimed in claim 20. Applicants request that the rejection be withdrawn for at least the foregoing reasons.

Claims 2, 10, 11 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Williams in view of U.S. Patent 5,755,437 to Ek. Applicants respectfully traverse the rejection and submit that claims 2, 10, 11 and 14 recite subject matter that is neither disclosed nor suggested by the combination of Williams and Ek. Ek fails to remedy the deficiencies of Williams as set forth above with regard to independent claims 1 and 3, from which dependent claims 2, 10, 11 and 14 depend. Thus, the comments made above with respect to Williams apply equally to claims 2, 10, 11 and 14. Furthermore, while Ek is provided allegedly to disclose features of the dependent claims, Applicants submit that Ek fails to disclose that which is asserted in the Office Action.

Ek relates to an arrangement including object straightening and repositioning means which straighten or reposition objects as they pass sequentially along a transport path. Abstract. Ek fails to teach or suggest an arrangement or method whereby aligning the single bank note in the desired alignment, wherein two edges of the bank note extend parallel to the transport direction, by displacing the single bank note in a direction deviating from the transport direction of the transport system based on the deviation, as recited in independent claims 1 and 3. Ek does disclose repositioning an already aligned bank note in a direction. See Fig.1 (illustrating repositioning of note 20 from position A' leftward to position A as described in col. 3 ll. 42-64).

However, with respect to realigning notes, Ek teaches that “horizontal skew” is corrected by driving the bank note in the direction of transport. See, e.g., Fig. 2 (illustrating driving the bank note along arrow 21, parallel to transport direction “B”); col. 3 l. 65 – col. 4 l. 10 (de-actuation of relay causes the left end of bank note to be driven forward); Fig. 5 (illustrating moving note 44 in transport direction at different velocities, e.g., V_0 and $V_0 + \Delta V_0$). Thus, the combination of Williams and Ek fails to teach or suggest each and every element of claims 2, 10, 11 and 14.

Accordingly, Applicants request that the rejection be withdrawn.

Claim 7 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Williams in view of U.S. Patent 5,140,166 to Gerlier. Applicants respectfully traverse. The combination of Williams and Gerlier fails to disclose or suggest each element of claim 7. Gerlier fails to remedy the deficiencies of Williams as set forth above for at least the reasons set forth in the Amendment filed August 2, 2009 with regard to independent claim 3, from which claim 7 depends through claim 5. Accordingly, Applicants request that the rejection be withdrawn.

Claims 8, 9, and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Williams in view of U.S. Patent 3,918,706 to Craft. Applicants respectfully traverse the rejection because the combination of cited references fails to disclose or suggest each and every feature of claims 8, 9, and 12.

Claims 8, 9, and 12 depend from claim 3. Thus, the comments made above with respect to Williams apply equally to claims 8, 9, and 12. Craft is directed to a pneumatic sheet transport and alignment mechanism that utilizes an edge guide. Craft fails to cure the deficiencies of Williams. Craft fails to teach or suggest aligning the single bank note in the desired alignment by displacing the single bank note in a direction deviating from the transport direction based on the deviation. In contrast, Craft merely discloses moving a sheet in the transport direction so that it contacts a guide. Thus, the combination of Williams and Craft fails to disclose or suggest each feature of claims 8, 9, and 12. Accordingly, the rejection is improper and Applicants request that it be withdrawn.

Claim 15 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Williams in view of Patent Application Publication 2001/0040331 by Forch. Applicants respectfully traverse the rejection because the combination of cited references fails to disclose or suggest each and

every feature of claim 15. Claim 15 depends from claim 4 which depends from claim 3. Thus, the comments made above with respect to Williams apply equally to claim 15. Forch fails to remedy the deficiencies of Williams as set forth above with regard to claim 3. For example, Forch, which discloses a device for aligning sheets by employing a sheet-gripper, see Abstract, fails to disclose or suggest displacing the bank note in a direction deviating from the transport direction of the transport system, while the bank note to be aligned is being transported in the transport direction as recited in claim 3. Rather, Forch discloses that a sheet is stopped, "held in a slippage-free manner on the positioning table" and subsequently positioned, received by a pregripper, and fed to the machine. See para. [0060]. Thus, for at least this reason, the rejection of claim 15 is improper and Applicants request that it be withdrawn.

Claim 16 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Williams in view of Patent 6,059,285 to Suga. Applicants respectfully traverse the rejection because the combination of cited references fails to disclose or suggest each and every feature of claim 16. Claim 16 depends from claim 3. Thus, the comments made above with respect to Williams apply equally to claim 16. Suga fails to remedy the deficiencies of Williams as set forth above with regard to claim 3. For example, Suga, which discloses a sheet conveying apparatus, see Abstract, fails to disclose or suggest that a device for determining a deviation stops the means for aligning, as soon as a single bank note has a desired alignment as recited in claim 3. Rather, Suga discloses that a control means controls a skew correction means on the basis of sheet skew amount information obtained from sheet skew amount detection means. See id. Suga discloses that the control device calculates an inclination based on the once obtained detection signal and that the skew correction means are controlled based on this once calculated inclination. See, e.g., col. 8 ll. 20-33. Thus, because the combination of Williams and Suga fail to disclose or suggest each limitation of independent claim 3, from which claim 16 depends, Applicants submit that the rejection of claim 16 is improper and request that it be withdrawn.

In view of the above, all objections and rejections have been sufficiently addressed. Applicants submit that the application is now in condition for allowance and requests that claims 1-20 be allowed and this application passed to issue. In the event that this paper is not timely

filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Deposit Account No. 02-2135.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the Applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

Respectfully submitted,

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